Fourth Industrial Revolution (4IR) Technologies for Sustainable Development in Manufacturing Sector

Rabia Almamlook  
Dept. of Industrial and Entrepreneurial Engineering and Engineering Management, Western Michigan University, USA  
Assistant Professor of Aviation Engineering  
Al Zawiya University, Zawiya, Libya  
rabiaemhamedm.almamlook@wmich.edu

Omar Albalawi  
Assistant Professor of Industrial Engineering  
University of Tabuk  
Tabuk, Saudi Arabia  
oalbalawi@ut.edu.sa

Nahar Alshammaria  
Dept. of Electrical Engineering Faculty of Engineering, Jouf University, Al-Jawf, Saudi Arabia  
Nahar85@hotmail.com

Abstract

Industry 4.0 and fourth industrial revolution (4IR) technologies are hot topics in the current business and technological era. However, very limited studies reported extensive reviews on these two research areas. The purpose of this paper is to give a comprehensive overview of the implications that 4IR technologies have on the Sustainable Development Goals based on the review and the analysis of the available literature. This study uses a literature review approach to find out the current research progress and future research possible of 4IR in terms of application and sustainability implications in the manufacturing sector. The paper is structured to give an insight into the role and impact of different 4IR technologies for manufacturing Sustainable Development Goals, then moves through the implications of new technologies on the Sustainable Development Goals, and finally, points out the areas that need to be addressed. We proposed a framework that identifies the effect of Industry 4.0 technologies on Sustainable Development Goals. This paper just tapped into the potentials and issues that 4IR while leaving room for in-depth research of any of the analyzed areas. The result of the study shows that 4IR has a significant impact on manufacturing sustainability. The findings of this study provide new research scopes and future research directions in different research areas of 4IR which will be valuable for industry and academia in order to achieve manufacturing sustainability with 4IR technologies.

Keywords:  
Fourth Industrial Revolution (4IR), Industry 4.0, Sustainable Development Goals, Manufacturing Sector

Biographies

Rabia Almamlook, Ph.D. She holds a B.E. degree in Mechanical and Industrial Engineering from the University of Tripoli, Libya in 1998. She received a master's degree in Engineering Management and a Ph.D. degree in Industrial Engineering and Engineering Management from Western Michigan University (WMU), USA, Kalamazoo, in 2007 and 2020, respectively. In 2008, she joined the Department of aviation Engineering, University of Al Zawiya, as Lecturer, her current research interests including smart city, Industrial fourth, Datamining, and Operational Research. She received teaching and research Awards from WMU. She is member in IEEE, IISE, and Alpha Pi Mu.
Omar Albalawi has a Ph.D. in Industrial Engineering from Western Michigan University (2021). He is currently an Assistant Professor of Industrial Engineering at the University of Tabuk” Industrial Engineering department.”. His interests include entrepreneurial engineering, engineering economy, energy, and clean air engineering. Omar has many Journal publications and different articles in conference proceedings. His professional affiliations include ASEE, IEEE, IISE, Alpha Pi Mu, and iabpad

Nahar Alshammaria, Ph.D. is currently an Assistant Professor of Electrical Engineering at the Faculty of Engineering at Jouf University. He holds an undergraduate degree in Electrical Engineering Department from Jouf University in 2011. a Master’s in Electrical Engineering, and a Ph.D. degree in Electrical Engineering Program of Electrical Engineering at Western Michigan University (WMU). He is interested in power electronics, electrical machines and drives, active filters, flexible ac transmission systems, high-voltage dc, and power quality, Smart-Gate System, and renewable energy